REMARKS

The Office Action issued May 31, 2002 has been reviewed and the comments of the U.S. Patent and Trademark Office have been considered. Claims 31 and 32 have been canceled. Claims 1, 4, 5, 33-35, 38, 45 and 48 have been amended. Accordingly, Applicant requests reconsideration of the pending claims 1-9, 14-20 and 33-53.

Applicant thanks the Examiner for indicating that claims 4 and 48 would be allowable if rewritten into independent form. Claims 4 and 48 have been rewritten into independent form as suggested by the Examiner. Accordingly, claims 4 and 48 are in condition for allowance.

Claims 1, 2, 5, 7, 8, 14, 15, 17, 19, 31, 32, 34, and 35 stand rejected under 35 U.S.C.§102(b) as being anticipated by U.S. Patent No. 4,530,324 to Tanaka *et al* ("Tanaka"). Claims 3, 6, 9, 16, 18, 33, 37, 49, 50, 51, and 52 stand rejected under 35 U.S.C.§103(a) as being unpatentable over Tanaka.

Insofar as these rejections are applicable to claim 14 and amended claims 1, 5, 16, 33, 38, and 45, Applicant respectfully traverses these rejections because the relied upon reference to Tanaka fails to teach or suggest the claimed invention as a whole.

In particular, each of the independent claims 1, 5, 14, and 38 recites a high-pressure piston pump and a bypass valve connected to one piston of the pistons (two or more) in the pump. The piston to which the bypass valve is connected to has a surface area that is different than any piston of the other pistons in the pump. Additionally, each of the independent claims 16, 33, and 45 recites that a normally open bypass valve is fluidly connected to one of the pistons to deactivate the one piston. Support for this amendment to the claims is provided in the originally filed specification at, for example, page 6, and Figs. 3 and 4.

In contrast, Tanaka fails to teach or suggest a bypass valve fluidly connected to a piston and which piston has a different surface area than other pistons that are not fluidly connected to the bypass valve. Tanaka states, at column 3, lines 24-35, that the pumping chambers 32 and 33 with respective plungers 34 and 36 (i.e., pistons) are fluidly connected to the axial passages 31a and 31b. The axial passages of both plungers 34, 36 (i.e. pistons) are in fluid communication with relief port 58 that is controlled by a control cap 60 (i.e. a bypass valve). The plungers 34a, 34b, 34c, 34d (i.e., the pistons of the first pump 80) and plungers 36a and 36b (i.e. the pistons of

the second pump 90) are fluidly connected to the control cap 60 (i.e. a bypass valve). That is, a control cap 60 (i.e., a bypass valve) of Tanaka is fluidly connected to all of the plungers (i.e., all six pistons) instead of a bypass valve fluidly connected to one piston of two or more pistons (i.e. a group of pistons) in the pump, and which piston has a different surface area than other pistons in the group, as recited in claims 1, 5, 14, and 38.

Furthermore, the control cap 60 (i.e. a bypass valve) of Tanaka is believed to be a normally closed valve and not a normally open valve. In particular, the control cap 60 is biased by spring 60a towards the linear motor 59 (Fig. 1 of Tanaka) and the axial position of the control cap 60 is a function of the axial movement of the linear electric motor 59 towards the first and second pumps 80 and 90. *See*, Tanaka, col. 9, lines 37-47. The axial movement of the control cap 60 determines whether the relief port 58 is aligned with relief passage 61, which port 58 and passage 61 permit fluid to return to the reservoir 23. It is believed that, in the absence of any electrical signal to the linear electric motor 59, the control cap 60 is biased towards the rightmost position, which would prevent the relief port 58 from communicating with relief passage 61, thereby preventing fluid communication between relief port 58 and reservoir 23. Hence, the control cap 60 is a normally closed control valve instead of a normally open bypass valve, as recited in claims 16, 33, and 45. Accordingly, the rejection to claims 1, 5, 14, 16, ~~33,~~ 38, and 45 should be withdrawn because the claimed invention as a whole recites features not taught or suggested by Tanaka.

Notwithstanding the deficiencies in Tanaka, the Office Action further relies upon Tanaka, and apparently Rembold and Klinger (cited in the Office Action of October 11, 2001), to allegedly render obvious the features recited in claims 3, 6, 9, 16, 18, 33, 37, 45, 49, 50, 51 and 52. Specifically, the Office Action states that it would have been obvious to bias a spill valve open (the spill valve is believed to be described in Rembold at col. 4, lines 35-38 because Rembold is the only cited reference with a spill valve). The Office Action also states that it would have been obvious to mount two pumps of Klinger in a housing as taught by Tanaka. Therefore, it appears that the Office Action relies upon a combination of references to Tanaka, Rembold or Klinger to render obvious the features of these claims. However, Applicant respectfully asserts that the proposed combination of Tanaka with the teachings of Rembold or

Klinger is improper and would change the principle operation of Tanaka, Rembold or Klinger and could render Tanaka, Rembold or Klinger unsuitable for their respective intended purposes. In particular, Rembold states, at column 4, lines 35-38, that the spill valve 36 is normally closed and operates to prevent an overload on pressure line 14. Therefore, the proposed modification to bias open a spill valve 36 of Rembold would prevent the pressure line 14 of Rembold or the axial passages 31a, 31b of Tanaka from being pressurized and could render the fuel supply system of Rembold or Tanaka inoperative and hence, unsuitable for their intended purposes. And as noted at MPEP §2143.01, "[i]f the proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." Finally, the proposed modification to Tanaka or Rembold with the teachings of Klinger fails to cure the deficiencies of Tanaka or Rembold. In particular, Klinger shows two pumps with respective valves 4 that maintain pressure in the fuel reservoir 6 at a constant pressure. Applicant asserts that the valves 4 of Klinger are not normally open bypass valves, as such valves would not permit the fuel reservoir of any proposed combination to be pressurized. Therefore, the proposed modification of Klinger with Tanaka or Rembold would teach away from the claimed invention because none of the relied-upon references teach or suggest a normally open bypass valve connected to one piston of a group of pistons in a pump, as recited in claims 3, 6, 9, 16, 18, 33, 37, 45, 49, 50, 51 and 52. Accordingly, claims 3, 6, 9, 16, 18, 33, 37, 45, 49, 50, 51 and 52 are patentable over Tanaka, Rembold or Klinger, singularly or in combination thereof.

Claims 2, 7, 8, 13, 15, 17, 19, 20, 34-36, 39-44 and 53 depend ultimately from a respective one of claims 1, 5, 14, 16, 33 and 38, and are also allowable at least because claims 1, 5, 14, 16, 33 and 38 are allowable, as well as for reciting additional features.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and allowance of the pending claims 1-9, 14-20, 33-53. Applicant respectfully invites the Examiner to contact the undersigned at (202) 739-5203 if there are any outstanding issues that can be resolved via a telephone conference.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

EXCEPT for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

Respectfully submitted,

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VERSION SHOWING MARKED UP CHANGES

IN THE CLAIMS:

Claims 31 and 32 have been canceled.

Claims 1, 4, 5, 33-35, 38, 45 and 48 have been amended as follows:

1. (Amended) A high pressure piston pump, comprising:

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

at least two pistons disposed in the housing;

a driveshaft for supplying power to drive the at least two pistons; and

a bypass valve fluidly connected to~~at least~~ one of the at least two pistons to deactivate the~~at least~~ one piston, wherein the piston to which the bypass valve is connected to has a surface area that is different than a surface area of the other piston of the at least two pistons.

4. (Amended) ~~The~~A ~~pump of claim 1 comprising three pistons~~ high pressure piston pump, comprising:

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

three pistons disposed in the housing;

a driveshaft for supplying power to drive the at least two pistons; and

a bypass valve fluidly connected to at least one of the at least two pistons to deactivate the at least one piston, wherein the bypass valve is fluidly connected to only one of the three pistons, and wherein the piston to which the bypass valve is connected to has a surface area that is different than a surface area of the other pistons.

5. (Twice Amended) A high pressure piston pump, comprising:

VERSION SHOWING MARKED UP CHANGES

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

at least two pistons disposed in the housing;

a driveshaft that drives the at least two pistons; and

a bypass valve fluidly connected to~~at least~~ one of the at least two pistons to deactivate the~~at least~~ one piston, wherein the piston to which the bypass valve is connected to has a surface area that is larger than a surface area of the other piston of the at least two pistons.

33. (Amended) ~~The method of claim 32 wherein the bypass valve is normally open~~A method of varying the flow output of a high pressure piston pump having at least two pistons comprising:

pumping fluid by a first piston of the at least two pistons, the first piston having a first surface area;

pumping fluid by a second piston of the at least two pistons, the second piston having a second surface area different from the first surface area; and

deactivating one of the at least two pistons wherein the one piston is deactivated by directing fluid displaced by the one piston to a normally open bypass valve ~~is normally open~~.

34. (Amended) The method of claim ~~32~~33 wherein the bypass valve directs the fluid to a low pressure area of the pump.

35. (Amended) The method of claim ~~32~~33 wherein the fluid displaced by the at least one piston is fuel for the engine.

38. (Twice Amended) A high pressure fuel injection system, comprising:

a source of fuel;

a low pressure pump;

a high pressure piston pump, the low pressure pump being disposed between the fuel source and the high pressure piston pump;

VERSION SHOWING MARKED UP CHANGES

a fuel rail including a plurality of fuel injectors, the high pressure piston pump being disposed between the low pressure pump and the fuel rail; and

a fuel return line connecting the fuel rail to a low pressure side of the high pressure pump; wherein the high pressure piston pump comprises a housing having a low pressure fuel inlet connected to an output of the low pressure pump, a high pressure fuel outlet connected to an input of the fuel rail, at least two pistons disposed in the housing, and a bypass valve fluidly connected to~~at least~~ one of the at least two pistons to deactivate the ~~at least~~ one piston, and wherein the~~at least~~ one piston to which the bypass valve is connected to has a surface area that is different than a surface area of the other piston of the at least two pistons.

45. (Amended) A high pressure fuel injection system, comprising:

a source of fuel;

a low pressure pump;

a high pressure piston pump, the low pressure pump being disposed between the fuel source and the high pressure piston pump;

a fuel rail including a plurality of fuel injectors, the high pressure piston pump being disposed between the low pressure pump and the fuel rail; and

a fuel return line connecting the fuel rail to a low pressure side of the high pressure pump;

wherein the high pressure piston pump comprises a housing having a low pressure fuel inlet connected to an output of the low pressure pump, a high pressure fuel outlet connected to an input of the fuel rail, at least two pistons disposed in the housing, and a normally open bypass valve fluidly connected to~~at least~~ one of the at least two pistons to deactivate the~~at least~~ one piston.

48. (Amended) ~~The~~A ~~pump of claim 46 comprising three pistons~~ high pressure piston pump, comprising:

VERSION SHOWING MARKED UP CHANGES

a housing having a low pressure fuel inlet and a high pressure fuel outlet;

three pistons disposed in the housing;

a driveshaft that drives the at least two pistons; and

a bypass valve fluidly connected to at least one of the at least two pistons to deactivate the at least one piston, wherein the bypass valve is fluidly connected to only one of the three pistons, and wherein the piston to which the bypass valve is connected to has a surface area that is larger than a surface area of the other piston of the at least two pistons, and wherein the bypass valve includes a solenoid for opening and closing the bypass valve.

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